USER INPUT DEVICE FOR ELECTRONIC DEVICE

TECHNICAL FIELD

[0001] The present invention relates generally to electronic devices, particularly portable electronic devices such as cellular mobile telephone devices, and more particularly to user input devices for use with such electronic devices to control on screen elements in a graphical user interface (GUI), such as cursor movement in a display graphic shown on a screen carried on the electronic device.

BACKGROUND OF THE INVENTION

[0002] The manipulation of on screen elements in a graphical user interface (GUI) for example, scrolling through a list displayed on the screen of an electronic device is a frequent and critical task associated with the operation and functioning of applications associated with the given electronic device. Such devices include for example mobile devices, gaming devices, computers, navigational systems, appliances, and other devices in which manipulation of on screen elements is required to carry out the function and operation of the electronic device. Accordingly, a user requires an intuitive method to quickly and accurately locate a specific item through the manipulation of the on-screen element in the graphical user interface for the electronic device.

[0003] Prior art controls and user input devices for manipulating on screen elements in a graphical user interface generally require frequent and often times awkward movement on the part of the user to manipulate the on screen element. Other prior art user input devices are generally unsatisfactory due to inaccurate targeting and/or sequencing movement through the menu list using confusing interactions. The prior art controls and user input devices also typically constrain the scrolling speed or movement rate of the on screen element. A further disadvantage is the prior art user input devices generally occupy a relatively large amount of space or volume within the electronic device or change the affect that the user input device has on the display depending upon the area over which the on-screen element is manipulated.

[0004] Other known user input devices in the prior art allow users to navigate graphical user interfaces and among such devices are touch pads, touch screens, scroll wheels, rotator dials, joy sticks, jog sticks, jog wheels, and other such controls which devices are well known to those skilled in the art. However, these user input devices typically require frequent and awkward movement with the operation of one or more keys to manipulate the on-screen element in the graphical user interface and which movements increase the risk of repetitive strain injury to the user.

[0005] Accordingly, it would be desirable to provide a user input device to manipulate on-screen elements in a graphical user interface that provides a reduction in the frequent and awkward movements on the part of a user in manipulating the on-screen elements in a graphical user interface.

[0006] It is a goal therefore to provide a user input device to control and manipulate on-screen elements in a graphical user interface with a reduction in the frequent and awkward movement on the part of a user by causing the on-screen elements to move continually without continuous input from a user.

[0007] It is a further goal of the present invention to increase the efficiency of such usage by accelerating the movement of the on-screen element based on the time or force applied to the user input device.

SUMMARY OF THE INVENTION

[0008] In accordance with a first aspect of the invention, an electronic device including a user input device is presented. The user input device includes a touch sensitive surface arranged to provide a pre-defined desired number of touch sensitive surface areas wherein each of the touch sensitive areas are associated with a corresponding pre-defined functionality. Appropriate control circuitry is responsive to touching contact with the touch sensitive surface for controlling the movement of a cursor in a display graphic such as a graphical user interface (GUI) shown on a screen carried by the electronic device. In a first pre-defined functionality a touching contact with a first pre-defined surface area causes the cursor to move in a corresponding first direction. In a second pre-defined functionality a touching contact with a second pre-defined surface area causes the cursor to move in a corresponding second direction, and in a third pre-defined functionality a touching contact with a third pre-defined surface area causes the cursor to stop movement. The first, second and third pre-defined surface areas are further arranged such that the first pre-defined surface area is juxtaposed and substantially continuous with the third pre-defined surface area and the third pre-defined surface area is juxtaposed and substantially continuous with the second pre-defined surface area. The touching contact may be a sliding motion touching contact in a first direction with the first pre-defined surface area for accelerating the cursor movement in the corresponding first direction. The sliding motion touching contact may be in a second direction opposite the first direction with the first pre-defined surface area for slowing the cursor movement in the corresponding first direction. The sliding motion touching contact may be in a first direction with the second pre-defined surface area for accelerating the cursor movement in the corresponding second direction. The sliding motion touching contact may be in a second direction with the second pre-defined surface area for slowing the cursor movement in the corresponding second direction. The direction of the cursor movement in the corresponding first direction is opposite to the cursor movement in the corresponding second direction.

[0009] The touching contact may be a tapping touching contact for moving the cursor a first pre-defined desired distance in the corresponding first direction in response to a tapping touching contact with the first pre-defined surface area and a second pre-defined desired distance in the corresponding second direction in response to a tapping touching contact with the second pre-defined surface area. Alternately, the cursor moves the respective first and second pre-defined desired distance each time the tapping touching contact is made with the respective first pre-defined surface area and the second pre-defined surface area.

[0010] The touching contact may further be a continued pressing touching contact against the touch sensitive surface and the cursor moves until the continued pressing touching contact is removed from the touch sensitive surface.

[0011] The touching contact with the third pre-defined surface area may activate a corresponding operation identi-